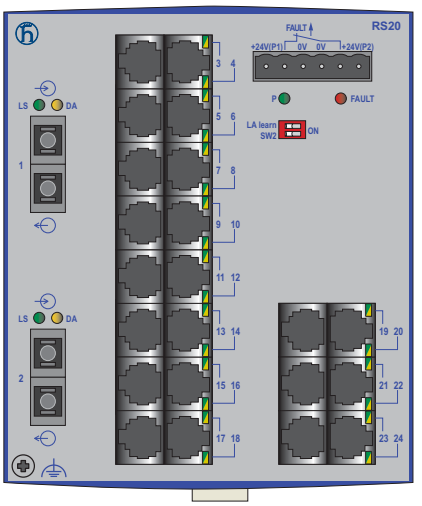
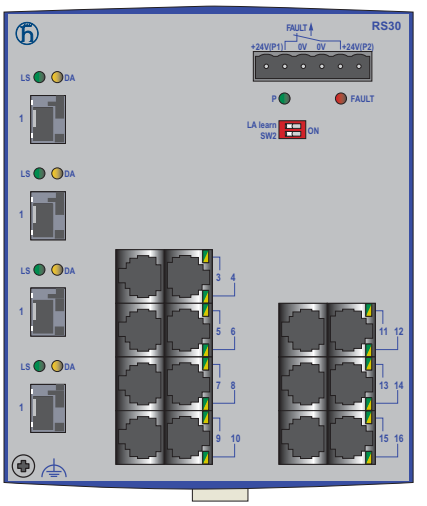
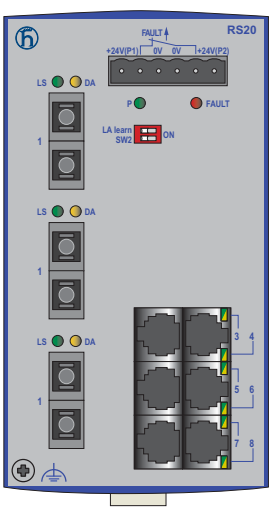
HIRSCHMANN
A BELDEN BRAND

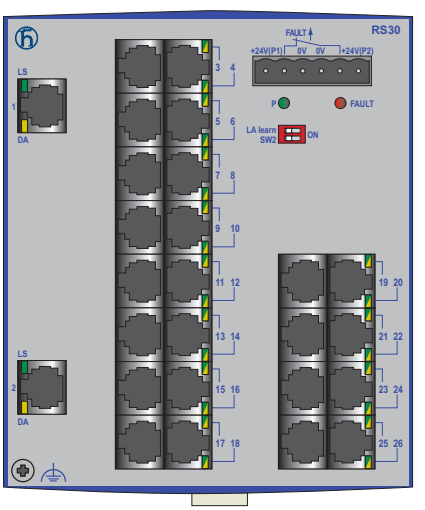
User Manual

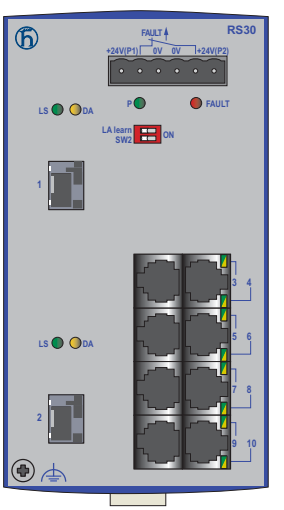
Installation
Industrial ETHERNET Rail Switch
RS20/RS30-...U Family (unmanaged)











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RS20/RS30-...U
Release 16 09/10

Technical Support
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Safety instructions

Notes on safety

This manual contains instructions to be observed for ensuring your personal safety and for preventing damage. The warnings appear next to a warning triangle with a different heading depending on the degree of danger posed:

Danger!
Means that death, serious physical injury or significant damage to property **will occur** if the corresponding safety measures are not carried out.

Warning!
Means that death, serious physical injury or significant damage to property **could occur** if the corresponding safety measures are not carried out.

Caution!
Means that minor physical injury or damage to property can occur if the required safety measures are not carried out.

Note: Contains important information on the product, on how to manage the product, or on the respective section of the documentation to which your special attention is being drawn.

Certified usage

Please observe the following: The device may only be employed for the purposes described in the catalog and technical description, and only in conjunction with external devices and components recommended or approved by the manufacturer. The product can only be operated correctly and safely if it is transported, stored, installed and assembled properly and correctly. Furthermore, it must be operated and serviced carefully.

Supply voltage

For safety reasons the devices have been designed to operate at low voltages. Thus, they may only be connected to the supply voltage connections and to the signal contact with SELV circuits with the voltage restrictions in accordance with IEC/EN 60950-1.
The supply voltage is electrically isolated from the housing.
☐ Use undamaged parts.

☐ Relevant for North America: For use in Class 2 circuits.
The device may only be connected to a supply voltage of class 2 that fulfills the requirements of the National Electrical Code, Table 11(b). If the voltage is being supplied redundantly (two different voltage sources), the combined supply voltages must fulfill the requirements of the National Electrical Code, Table 11(b).

☐ Relevant for North America: For use in Class 2 circuits.
Only use copper wire/conductors of class 1, 75 °C (167 °F).

☐ Relevant for North America
for devices certified for hazardous locations:
Power, input and output (I/O) wiring must be in accordance with Class I, Division 2 wiring methods [Article 501-4(b) of the National Electrical Code, NFPA 70] and in accordance with the authority having jurisdiction.

☐ Relevant in Europe for RS20 devices and RS30 devices used in explosive gas atmospheres according to ATEX Directive 94/9 EC:
- ▶ Make sure that the device has the following label:
  ⟨Ex⟩ II 3G Ex nA II C T4
- ▶ The product must be mounted in a suitable IP 54-certified housing – tested to 4 J impact to minimize the risk of mechanical damage.
- ▶ For ambient temperatures below -10 °C and above +60 °C use wiring suitable for both the minimum and maximum temperatures.
- ▶ Connectors may be connected exclusively in dead-voltage state.
- ▶ DIP switches may be switched exclusively in dead-voltage state.

☐ The device does not contain any service components. Internal fuses are only triggered if there is a fault in the device. If the device is not functioning correctly, or if it is damaged, switch off the voltage supply and return the device to the plant for inspection.

☐ Only switch on the supply voltage to the device if
- the housing is closed,
- the terminal blocks are wired up correctly and
- the terminal blocks are connected.

Shielding ground

Note: The shielding ground of the connectable twisted pair lines is connected to the front panel as a conductor.

☐ Beware of possible short circuits when connecting a cable section with conductive shielding braiding.

Housing

Warning!
Never insert sharp objects (small screwdrivers, wires, etc.) into the inside of the product. There is the risk of an electric shock.

Warning!
When installing the device, make sure the ventilation slots remain free, as otherwise damage can occur through overheating.

Only technicians authorized by the manufacturer are permitted to open the housing.
The housing is grounded via the separate ground screw on the bottom left of the front panel.

☐ The clearance to the ventilation slots of the housing must be at least 10 cm (3.94 in).

☐ The device must be installed in the vertical position.
☐ If installed in a living area or office environment, the device must be operated exclusively in switch cabinets with fire protection characteristics in accordance with EN 60950-1.

Environment

The device may only be operated at the specified surrounding air temperature (temperature of the ambient air at a distance of up to 5 cm (1.97 in) from the device) and relative air humidity specified in the technical data.

☐ Install the device in a location where the climatic threshold values specified in the technical data will be observed.
☐ Use the device only in an environment within the contamination level specified in the technical data.

Qualification requirements for personnel

Qualified personnel as understood in this manual and the warning signs, are persons who are familiar with the setup, assembly, startup, and operation of this product and are appropriately qualified for their job. This includes, for example, those persons who have been:

- trained or directed or authorized to switch on and off, to ground and to label power circuits and devices or systems in accordance with current safety engineering standards;
- trained or directed in the care and use of appropriate safety equipment in accordance with the current standards of safety engineering;
- trained in providing first aid.

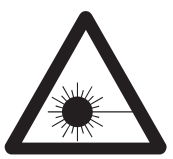
General safety instructions

Electricity is used to operate this equipment. Comply with every detail of the safety requirements specified in the operating instructions regarding the voltages to apply (see page 4).

Non-observance of these safety instructions can therefore cause material damage and/or serious injuries.

- ☐ Only appropriately qualified personnel should work on this device or in its vicinity. These personnel must be thoroughly familiar with all the warnings and maintenance procedures in accordance with this operating manual.
- ☐ The proper and safe operation of this device depends on proper handling during transport, proper storage and assembly, and conscientious operation and maintenance procedures.
- ☐ Never start operation with damaged components.
- ☐ Only use the devices in accordance with this manual. In particular, observe all warnings and safety-related information.
- ☐ Any work that may be required on the electrical installation may only be carried out by personnel trained for this purpose.

Note: LED or LASER components in compliance with IEC 60825-1 (2001):
CLASS 1 LASER PRODUCT
CLASS 1 LED PRODUCT



Warning
Laser light
Do not look into the beam or view it directly with optical instruments (e.g. magnifying glasses, microscopes).
Failure to observe this warning within a distance of 100 mm can endanger your sight.
Light is emitted from the optical connections or from the ends of the optical fibers that are connected to them. Light Emitting Diode CLASS 2M, wave length 650 nm, power <2 mW, according to
DIN EN 60825-1:2003-10.

National and international safety regulations

- ☐ Make sure that the electrical installation meets local or nationally applicable safety regulations.

CE marking

The devices comply with the regulations contained in the following European directive(s):

2004/108/EG
Directive of the European Parliament and the council for standardizing the regulations of member states with regard to electromagnetic compatibility.

In accordance with the above-named EU directive(s), the EU conformity declaration will be at the disposal of the relevant authorities at the following address:

Hirschmann Automation and Control GmbH
Stuttgarter Str. 45-51
72654 Neckartenzlingen
Tel.: +49 1805 141538

The product can be used in living areas (living area, place of business, small business) and in industrial areas.

- Interference immunity: EN 61000-6-2:2005
- Emitted interference: EN 55022:2006 + A1:2007 Class A

Warning!
This is a class A device. This device can cause interference in living areas, and in this case the operator may be required to take appropriate measures.
The assembly guidelines provided in these instructions must be strictly adhered to in order to observe the EMC threshold values.

FCC note:

This device complies with part 15 of FCC rules. Operation is subject to the following two conditions : (1) This device may not cause harmful interference; (2) this device must accept any interference received, including interference that may cause undesired operation.
Appropriate testing has established that this device fulfills the requirements of a class A digital device in line with part 15 of the FCC regulations.
These requirements are designed to provide sufficient protection against interference when the device is being used in a business environment. The device creates and uses high frequencies and can radiate same, and if it is not installed and used in accordance with this operating manual, it can cause radio transmission interference. The use of this device in a living area can also cause interference, and in this case the user is obliged to cover the costs of removing the interference.

Recycling note

After usage, this product must be disposed of properly as electronic waste, in accordance with the current disposal regulations of your county, state and country.

Key

The symbols used in this manual have the following meanings:

▶	Listing
☐	Work step
■	Subheading

1 Device description

The RS20/RS30-...U family provides you with a range of Switch variants. You can set up your device individually based on different criteria:

- Number of ports
- Transmission speed
- Media type
- Types of connectors
- Temperature range
- Certifications

The RS20/RS30-...U devices are designed for the special requirements of industrial automation. They meet the relevant industry standards, provide very high operational reliability, even under extreme conditions, and also long-term reliability and flexibility.

The devices allow you to set up switched industrial ETHERNET networks that conform to the IEEE 802.3 and 802.3u standards using copper wires or optical fibers in a line structure.

The devices work without a fan.

The voltage is supplied redundantly.
The devices are mounted very quickly by snapping them onto the DIN rail.

Depending on the device variant, you can choose various media to connect terminal devices and other infrastructure components:

- twisted pair cable
- multimode F/O
- singlemode F/O

The twisted pair ports support:

- Autocrossing
- Autonegotiation
- Autopolarity

The Hirschmann network components help you to establish continuous communication across all levels of the company. Connect your devices to:

- devices of the MICE family
- backbone devices of the MACH family
- the BAT wireless transmission system
- the EAGLE security system
- products for the LION control room / MACH 100 family

1.1 Description of the device variants

The devices differ with regard to the number of interfaces and the media type for connecting segments.

The table below shows 2 port categories for each product variant: uplink ports and other ports. The table also shows for each product category the number of ports you can select, and the type of ports. In the column for the port type, the abbreviations F/O (optical fiber) and TP (twisted pair) indicate the media type, while the abbreviations DSC, ST, SFP and RJ45 indicate the socket type.

Variant	Uplink ports		Other ports	
	Number	Type	Number	Type
RS20-...U	2	10/100 Mbit/s, media selectable, DSC, ST, RJ45	6, 14, 22	10/100 Mbit/s, TP, RJ45
	3	10/100 Mbit/s, media selectable, DSC, ST, RJ45	6, 14, 22	10/100 Mbit/s, TP, RJ45
RS30-...U	2	1000 Mbit/s, media selectable, SFP, RJ45	8, 16, 24	10/100 Mbit/s, TP, RJ45
	4	2x100/1000 Mbit/s, 2x 100 Mbit/s, F/O, SFP	6, 14, 22	10/100 Mbit/s, TP, RJ45

Table 1: Number and type of ports

The devices also provide you with the following options for selecting the variant you desire:

Operating temperature	Standard	0 °C to +60 °C
	Extended	-40 °C to +70 °C
	Extended with conformal coating	-40 °C to +70 °C
Certifications / declarations	CE, UL508, ISA 12.12.01 (UL1604)	
	CE, UL508, ISA 12.12.01 (UL1604), Germanischer Lloyd (GL), IEC/EN 61850-3 declaration (sub station), IEEE 1613 (sub station), EN 50121-4 railway (along track)	
	CE, UL508, ISA 12.12.01 (UL1604), Germanischer Lloyd (GL), IEC/EN 61850-3 declaration (sub station), IEEE 1613 (sub station), EN 50121-4 railway (along track), ATEX RL 94/9 EG (hazardous location)	

The devices comply with the specifications of the standard(s):

- ISO/IEC 8802-03 10BASE-T/100BASE-TX/1000BASE-T
- ISO/IEC 8802-03 100BASE-FX
- ISO/IEC 8802-03 1000BASE-SX/LX

1.1.1 Combination options for RS20/30-...U

The product designation of your device is made from combining the desired product characteristics in accordance with the following table. You will find the corresponding short designation in columns 3 and 4.

Item	Characteristic	Ident.	Ident.2 a)	Property
1 to 4	Product	RS20		Rail Switch without gigabit ports
		RS30		Rail Switch with gigabit ports
5	- (hyphen)	-		
6 to 7	Number of 10/100	08		8 * 10/100 Mbit Ethernet
	Mbit ports	09		9 * 10/100 Mbit Ethernet
		16		16 * 10/100 Mbit Ethernet
		17		17 * 10/100 Mbit Ethernet
		24		24 * 10/100 Mbit Ethernet
		25		25 * 10/100 Mbit Ethernet
8 and 9	Number of 1000	00		0 * 1000 Mbit Ethernet
	Mbit ports	02		2 * 1000 Mbit Ethernet
10 and 11 a)	Uplink port(s)	T1		Twisted pair T(X), RJ45
	1 port (Ident. column)	M2	MM b)	Multimode FX, DSC, 100 Mbit
	or alternatively	M4	NN b)	Multimode FX, ST, 100 Mbit
	2 ports	S2	VV b)	Singlemode FX, DSC, 100 Mbit
	(Ident.2 column)	S4	UU b)	Singlemode FX, ST, 100 Mbit
		L2	LL b)	Singlemode Longhaul, DSC, 100 Mbit
		O6	OO c)	SFP slot, 1000 Mbit
		Z6	ZZ c)	SFP slot, 100 Mbit
12 and 13 a)	See items 10 and 11			
14	Temperature range	S		Standard 0 °C to +60 °C
		T		Extended -40 °C to +70 °C d)
		E		Extended -40 °C to +70 °C, conformal coating d)
15	Voltage range	D		9.6 VDC to 60 VDC or 18 VAC to 30 VAC
16	Certification	A		CE, UL508, ISA 12.12.01 (UL1604)
		H e)		CE, UL508, ISA 12.12.01 (UL1604), GL, Railway (along track), Sub Station
		B e)		CE, UL508, ISA 12.12.01 (UL1604), GL, Railway (along track), Sub Station, Hazardous Location (ATEX)
17	Software variant	U		Unmanaged

Table 2: Combination options for the device variants RS20...U/RS30...U

a. For device variants with two uplink ports you use the “Ident.” column for items 10+11 and for items 12+13.
For device variants with three uplink ports you use the “Ident.2” column for items 10+11 and the “Ident.” column for items 12+13.
For device variants with four uplink ports you use the “Ident.2” column for items 10+11 and for items 12+13.
b. For RS20-0900...U, RS20-1700...U, RS20-2500...U
c. In connection with “2nd uplink port” “ZZ” and “1st uplink port” “OO”.
d. Not when using GG or G2 transceivers.
e. Without railway certification EN50155 (Train).

Examples for product name

RS30-	RS30-	Rail Switch with gigabit ports
08	08	8 * 100 Mbit/s Ethernet ports
02	02	2 * 1000 Mbit/s Ethernet ports
O6	O6	Port 1 = SFP slot, 1000 Mbit/s
T1	T1	Port 2 = twisted-pair TX, RJ45 connector, 1000 Mbit/s
T	T	Temperature range extended: -40 °C to +70 °C
D	D	Voltage range: 9.6 V DC to 60 V DC or 18 V AC to 30 V AC
A	A	Certifications: CE, UL 508, ISA 12.12.01 (UL 1604)
U	U	Software variant: Unmanaged

Table 3: Example of RS30-...U with 2 uplink ports: RS30-0802O6T1TDAU

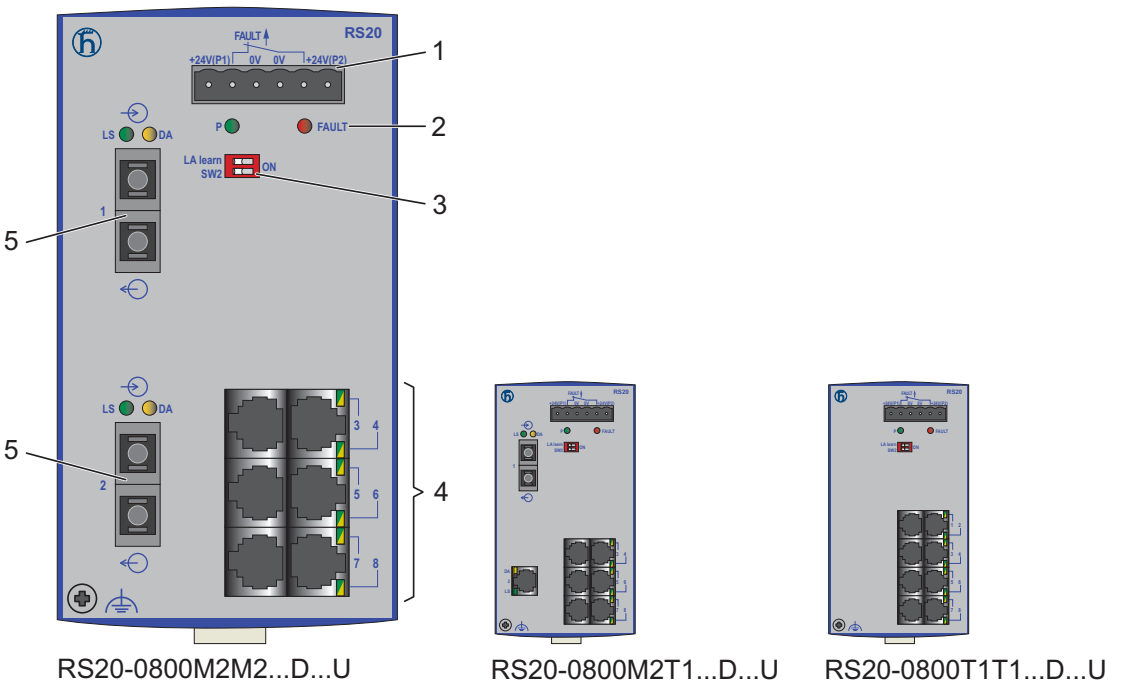
RS20-	RS20-	Rail Switch without gigabit ports
09	09	9 * 100 Mbit/s Ethernet ports
00	00	0 * 1000 Mbit/s Ethernet ports
MM	MM	Port 1 + 2 = 2 * Multimode FX, DSC, 100 Mbit/s
M2	M2	Port 3 = Multimode FX, DSC, 100 Mbit/s
S	S	Temperature range standard: 0 °C to +60 °C
D	D	Voltage range: 9.6 V DC to 60 V DC or 18 V AC to 30 V AC
A	A	Certifications: CE, UL 508, ISA 12.12.01 (UL 1604)
U	U	Software variant: Professional

Table 4: Example of RS20-...U with 3 uplink ports: RS20-0900MMM2SDAU

Additional examples of devices with 3 or 4 uplink ports:

- RS20-0900**NNM4**TDAU for RS20 with 3 uplink ports (ST)
  NN: 2 * Multimode FX, ST, 100 Mbit/s (ports 1 and 2)
  M4: 1 * Multimode FX, ST, 100 Mbit/s (port 3)
- RS30-2402**OOZZ**TDAU for RS30 with 4 uplink ports (SFP)
  OO: 2 * SFP slot, 1000 Mbit/s (ports 1 and 2)
  ZZ: 2 * SFP slot, 100 Mbit/s (ports 3 and 4)

1.1.2 Number of ports and media for RS20...U



RS20-0800M2M2...D...U RS20-0800M2T1...D...U RS20-0800T1T1...D...U

*Figure 1: Device variants with 8 * 10/100 Mbit/s ports (RS20-0800...U)*
1 – plug-in terminal block, 6-pin
2 – LED display elements
3 – 2-pin DIP switch
4 – ports in compliance with 10/100BASE-T(X) (RJ45 connections)
5 – port 1 + port 2, free choice of connections:
T1: Twisted-pair T(X), RJ45, 10/100 Mbit/s
M2: Multimode FX, DSC, 100 Mbit/s
M4: Multimode FX, ST, 100 Mbit/s
S2: Singlemode FX, DSC, 100 Mbit/s
S4: Singlemode FX, ST, 100 Mbit/s
L2: Singlemode Longhaul FX, DSC, 100 Mbit/s
G2: Singlemode Longhaul+ FX, DSC, 100 Mbit/s, 200 km

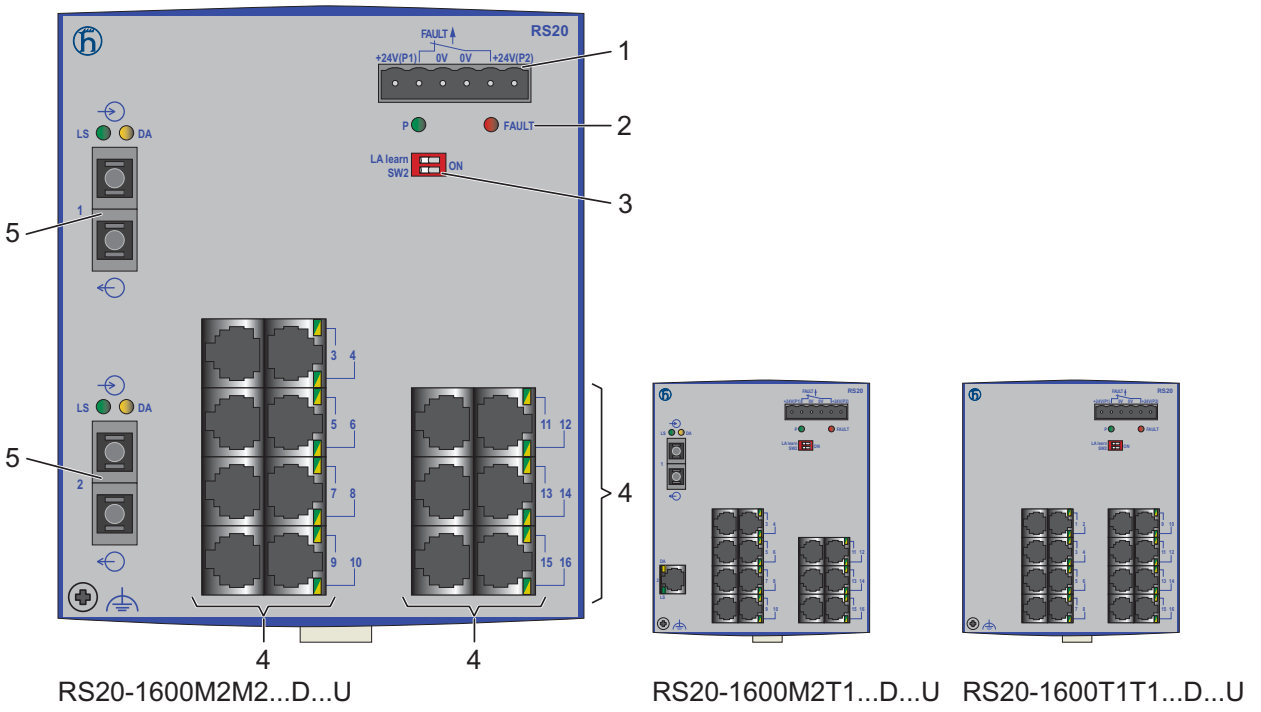


*Figure 2: Device variants with 16 * 10/100 Mbit/s ports (RS20-1600...U)*
1 to 5 – see fig. 1

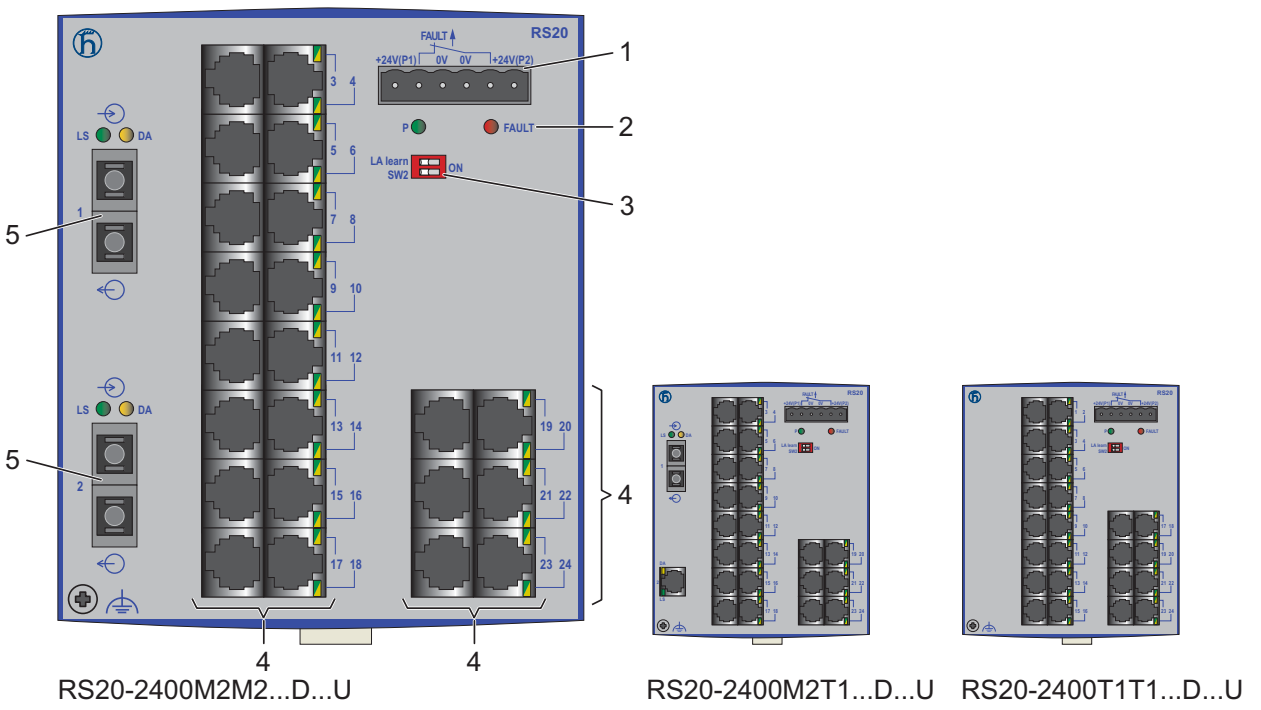


*Figure 3: Device variants with 24 * 10/100 Mbit/s ports (RS20-2400...U)*
1 to 5 – see fig. 1

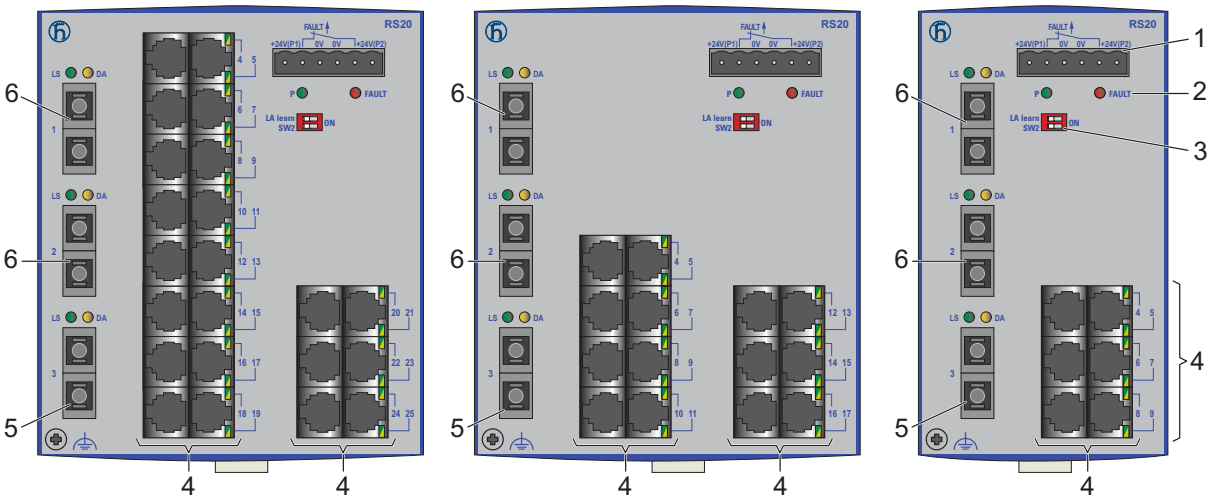


Figure 4: Device variants with 3 uplink ports (100 Mbit/s)
1 to 4 – see fig. 1
5 – port 3, free choice of connection:
T1: Twisted-pair T(X), RJ45, 10/100 Mbit/s
M2: Multimode FX, DSC, 100 Mbit/s
M4: Multimode FX, ST, 100 Mbit/s
S2: Singlemode FX, DSC, 100 Mbit/s
S4: Singlemode FX, ST, 100 Mbit/s
L2: Singlemode Longhaul FX, DSC, 100 Mbit/s
G2: Singlemode Longhaul+ FX, DSC, 100 Mbit/s, 200 km
6 – port 1 + port 2, free choice of connections:
MM: Multimode FX, DSC, 100 Mbit/s
NN: Multimode FX, ST, 100 Mbit/s
VV: Singlemode FX, DSC, 100 Mbit/s
UU: Singlemode FX, ST, 100 Mbit/s

1.1.3 Number of ports and media for RS30...U

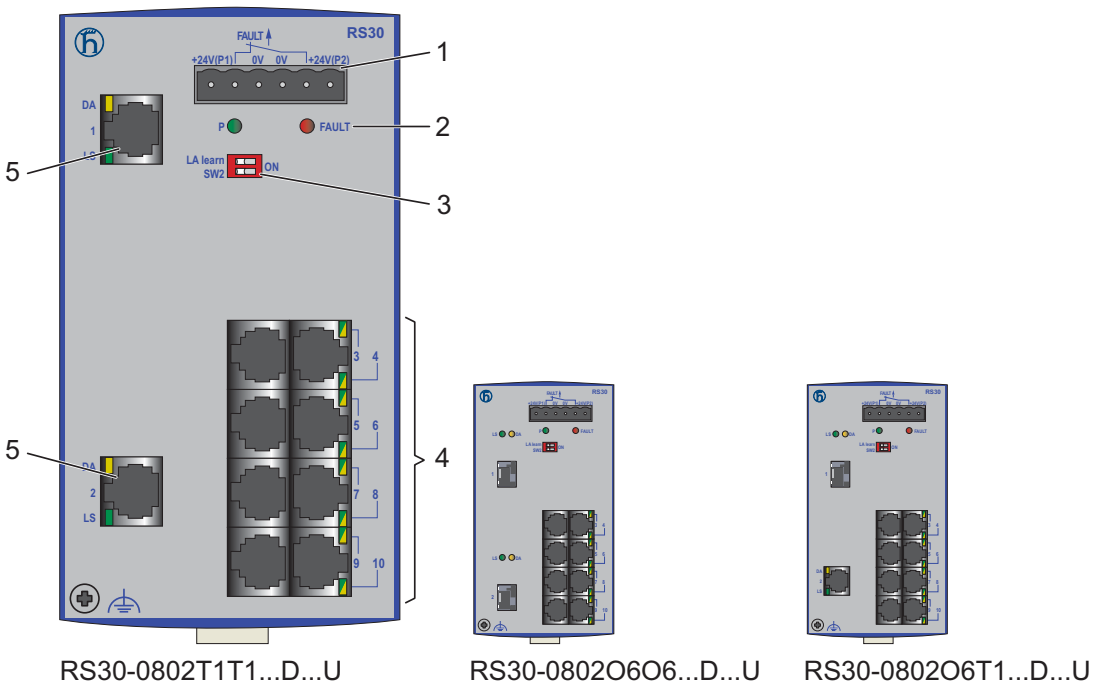


*Figure 5: Device variants with 2 * 1000 Mbit/s ports and 8 * 10/100 Mbit/s ports (RS30-0802...U)*
1 – plug-in terminal block, 6-pin
2 – LED display elements
3 – 2-pin DIP switch
4 – ports in compliance with 10/100BASE-T(X) (RJ45 connections)
5 – port 1 + port 2, free choice of connections:
T1: Twisted-pair T(X), RJ45, 10/100/1000 Mbit/s
O6: SX/LX, SFP slot, 1000 Mbit/s

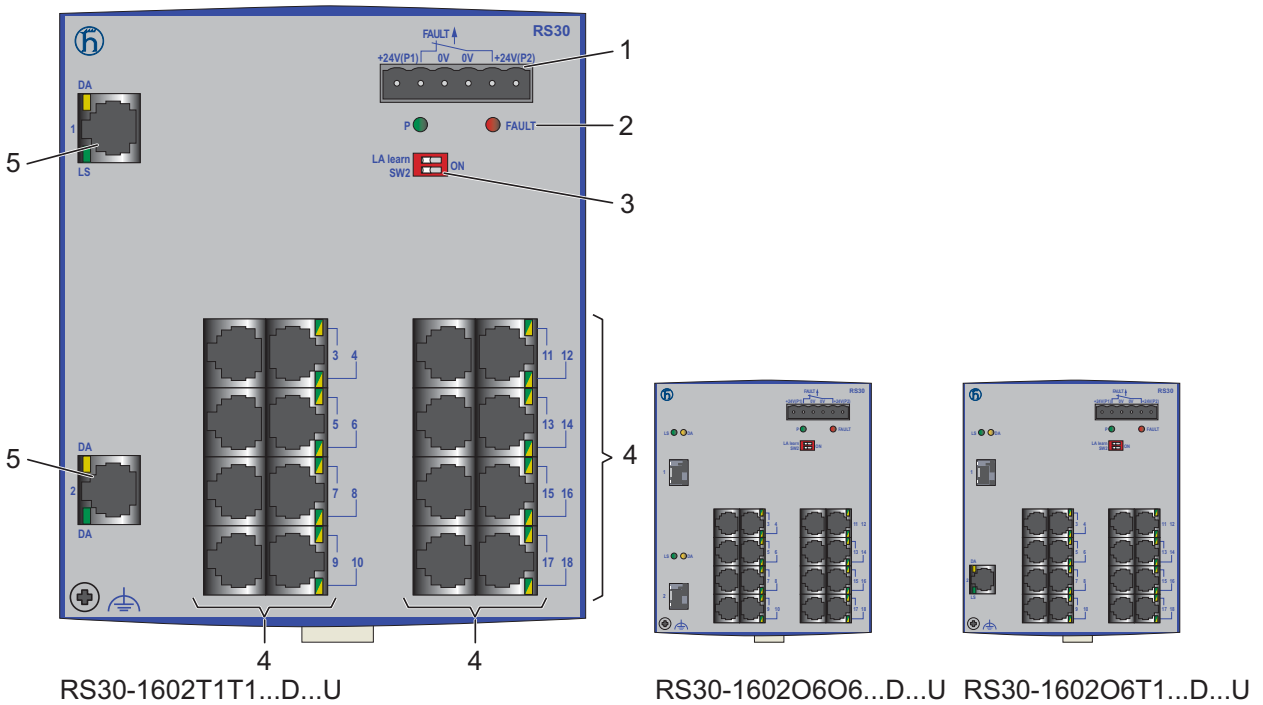


*Figure 6: Device variants with 2 * 1000 Mbit/s ports and 16 * 10/100 Mbit/s ports (RS30-1602...U)*
1 to 5 – see fig. 5

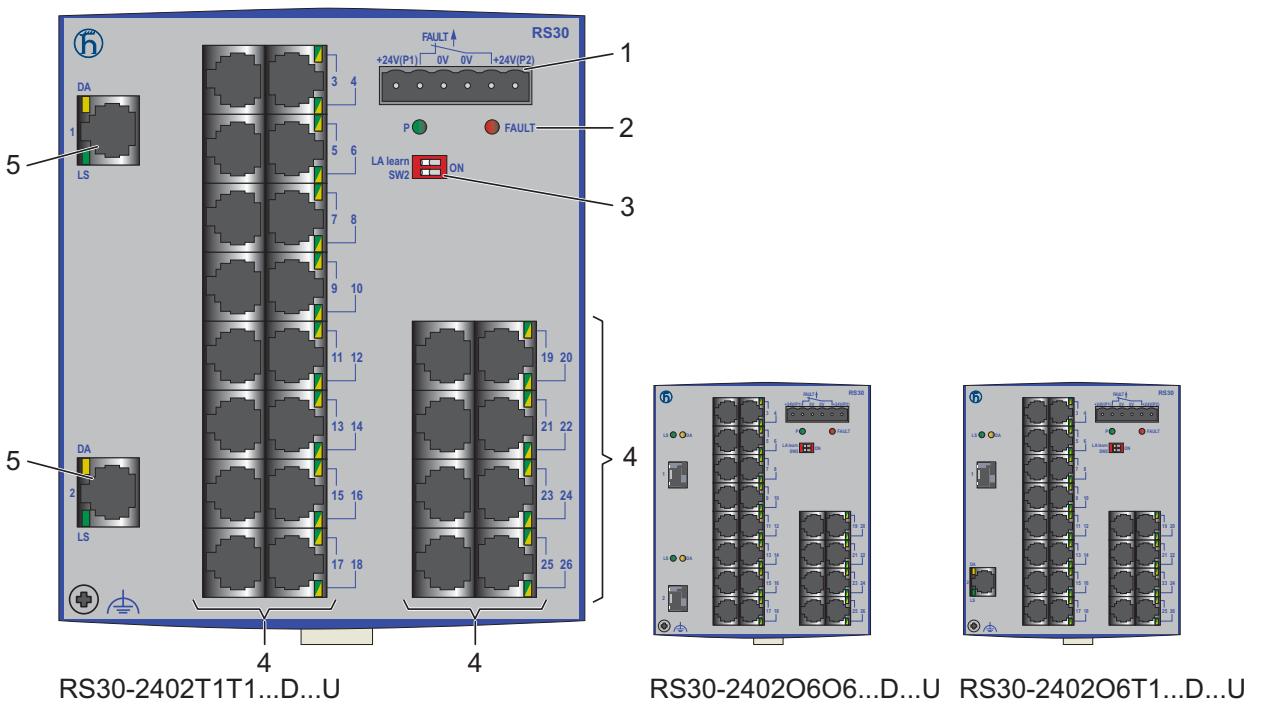


*Figure 7: Device variants with 2 * 1000 Mbit/s ports and 24 * 10/100 Mbit/s ports (RS30-2402...U)*
1 to 5 – see fig. 5

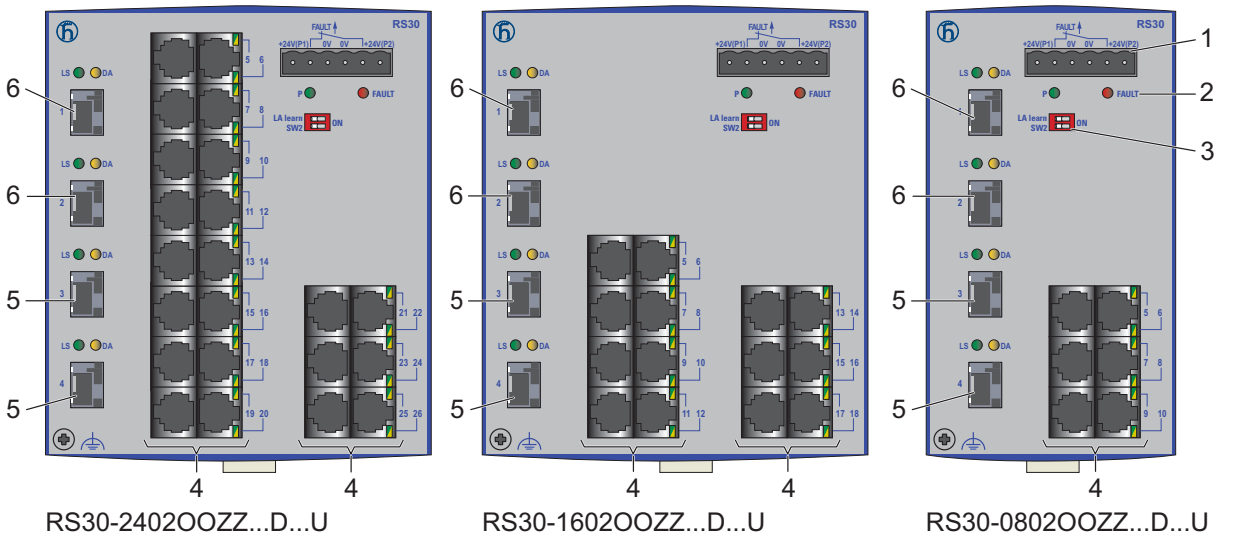


Figure 8: Device variants with 4 uplink ports
1 to 4 – see fig. 5
5 – port 3 + port 4:
ZZ: FX, SFP slot, 100 Mbit/s
6 – port 1 + port 2:
OO: FX/SX/LX, SFP slot, 100/1000 Mbit/s

2 Assembly and start-up

The devices have been developed for practical application in a harsh industrial environment. The installation process is correspondingly simple. On delivery, the device is ready for operation.

The following steps should be performed to install and configure a switch:

- Unpacking and checking
- Installing the SFP modules (optional)
- Adjust DIP switch settings
- Connect the terminal block for voltage supply and signal contact and connect the supply voltage
- Install the device on the DIN rail, grounding
- Install the terminal block, start-up procedure
- Connecting the data lines

2.1 Installing the device

2.1.1 Unpacking and checking

☐ Check that the contents of the package are complete (see page 33 “Scope of delivery“).
☐ Check the individual parts for transport damage.

2.1.2 Installing the SFP modules (optional)

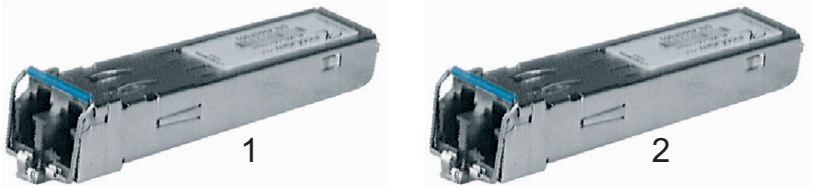


Figure 9: 1 - Fast EHTERNET fiber optic SFP module
2 - Gigabit ETHERNET fiber optic SFP module

☐ Before attaching an SFP module, first remove the protective cap over the socket.
☐ Push the SFP module with the lock closed into the socket until it latches audibly in place.

Note: Only use Hirschmann SFP modules (see page 34 “Accessories“).

2.1.3 Adjust DIP switch settings

The 2-pin DIP switch on the front panel of the device gives you the following options:

Figure 10: 2-pin DIP switch

LA learn switch Item	Learn ports	Link monitoring
ON	on	on
OFF	off	off

Note: DIP switch “SW2” is not being used, so the switch setting has no effect.

State on delivery: both DIP switches “OFF”.
No ports have been learned, and link monitoring is disabled at the ports.
☐ Before starting operation of the device, check whether the default settings of the DIP switch correspond to your requirements.

2.1.4 Connecting the terminal blocks for supply voltage and signal contact

The supply voltage and the signal contact are connected via a 6-pin terminal block with a snap lock.

Caution!
Note the safety instructions (see page 4 “Notes on safety“) and only connect a supply voltage that corresponds to the type plate of your device. Make sure that the contact load capability of the signal contact is not exceeded (see page 30 “Technical data“).

Supply voltage

Redundant power supplies can be used. Both inputs are uncoupled. There is no distributed load. With redundant supply, the power supply unit supplies the device only with the higher output voltage. The supply voltage is electrically isolated from the housing.

You can choose between DC or AC voltage when connecting the supply voltage. You use the +24V and 0V pins to connect the AC voltage (see fig. 11).

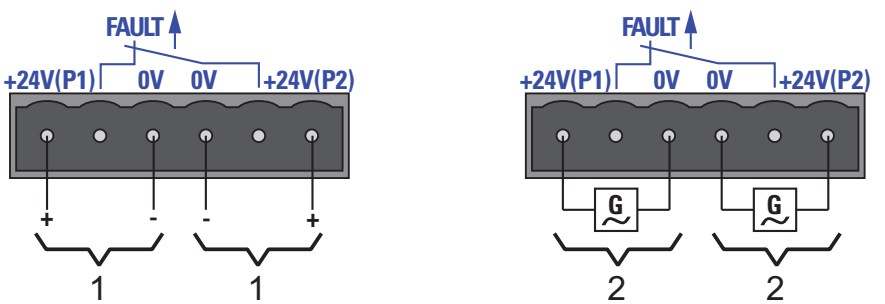


Figure 11: Connecting the supply voltage at the 6-pin terminal block
1 – DC voltage, voltage range: 9.6 V DC to 60 V DC
2 – AC voltage, voltage range: 18 V AC to 30 V AC

Note: With non-redundant supply of the main voltage, the device reports a loss of power. You can avert this message by supplying the voltage over the two inputs.

“FAULT” signal contact

- The signal contact (“FAULT”, for pin assignment of terminal block, see fig. 11) monitors the functioning of the device, thus enabling remote diagnostics.

A break in contact is used to report the following conditions via the potential-free signal contact (relay contact, closed circuit):

- The detected inoperability of at least one of the two voltage supplies (voltage supply 1 or 2 is below the threshold value).
- A continuous malfunction in the device.
- The defective link status of at least one port with active link monitoring. In the delivery state, link status monitoring is deactivated.
- The loss of ring redundancy reserve.
- A detected error during the self-test.

☐ Pull the terminal block off the device and connect the power supply and signal lines.

2.1.5 Installing the device on the DIN rail, grounding

Mounting on the DIN rail

☐ Mount the device on a 35 mm DIN rail in accordance with DIN EN 60175.

☐ Attach the upper snap-in guide of the device into the DIN rail and press it down against the DIN rail until it snaps into place.

Note: The shielding ground of the connectable twisted pair lines is connected to the front panel as a conductor.

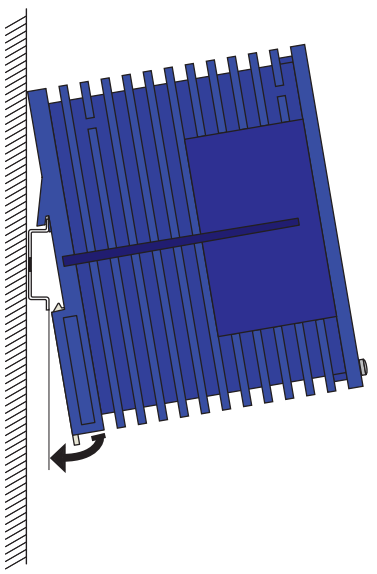


Figure 12: Mounting on the DIN rail

Grounding

The front panel of the device is grounded via the separate ground screw.

2.1.6 Dimension drawings

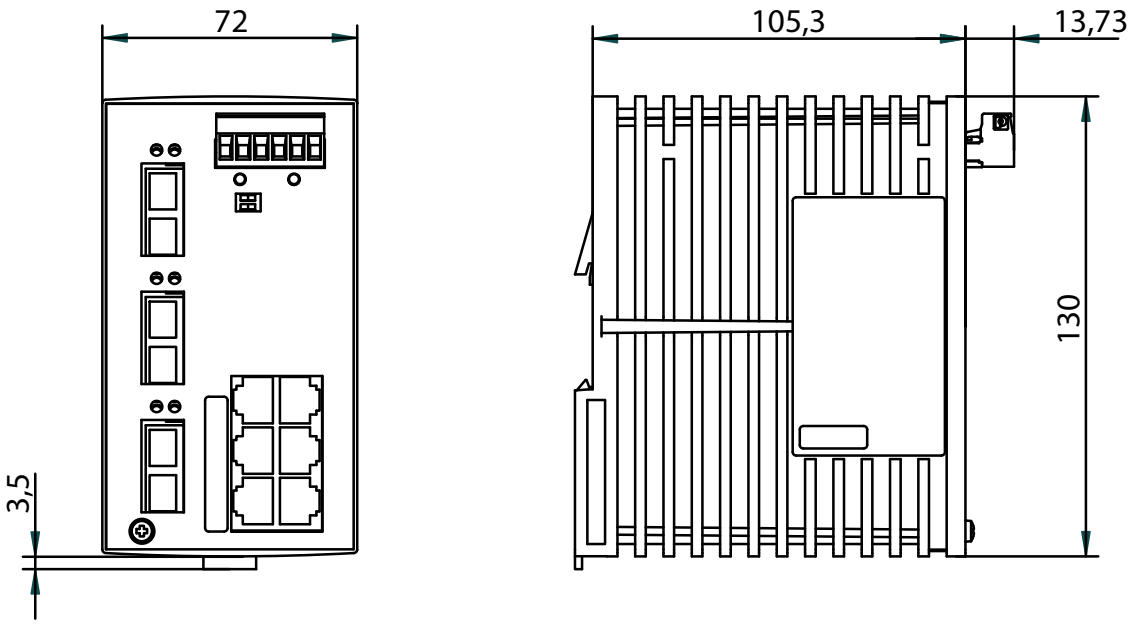


Figure 13: Dimensions of device variants RS20...U/RS30...U with 8 to max. 10 ports

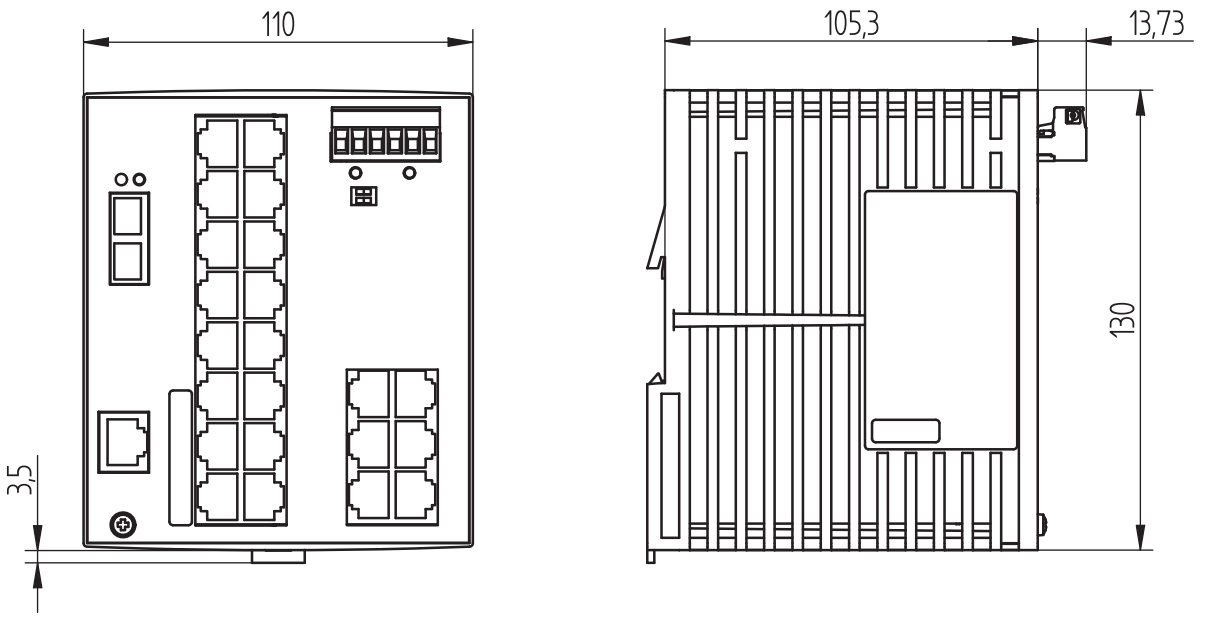


Figure 14: Dimensions of device variants RS20...U/RS30...U with 16 to max. 26 ports

2.1.7 Installing the terminal block, start-up procedure

☐ Mount the terminal block for the voltage supply and signal contact on the front of the device using the snap lock. Make sure that the snap lock snaps into place.

Connecting the voltage supply via the terminal block starts the operation of the device.

2.1.8 Connecting the data lines

You can connect terminal devices and other segments at the ports of the device via twisted pair cables or F/O cables.

☐ Install the data lines according to your requirements.

10/100 Mbit/s twisted pair connection

These connections are RJ45 sockets.
10/100 Mbit/s TP ports enable the connection of terminal devices or independent network segments according to the IEEE 802.3 10BASE-T/ 100BASE-TX standard.
These ports support:

- Autonegotiation
- Autopolarity
- Autocrossing

The socket housing is electrically connected to the front panel.

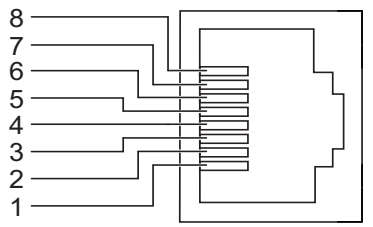
Figure	Pin	Function	
	1	RD+	Receive Data +
	2	RD-	Receive Data -
	3	TD+	Transmit Data +
	6	TD-	Transmit Data -
	4,5,7,8	Not used	

Table 5: Pin assignment of a TP/TX interface in MDI-X mode, RJ45 socket

10/100/1000 Mbit/s twisted pair connection

These connections are RJ45 sockets.

10/100/1000 Mbit/s TP ports enable the connection of terminal devices or independent network segments according to the IEEE 802.3 10BASE-T/ 100BASE-TX/1000BASE-T standard.

These ports support:

- Autonegotiation
- Autopolarity
- Autocrossing

State on delivery: autonegotiation activated.
The socket housing is electrically connected to the front panel.
The pin assignment corresponds to MDI-X.

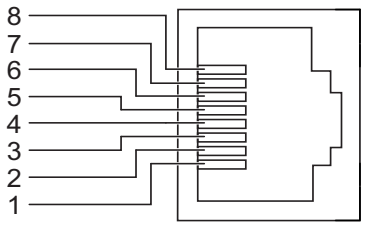
Figure	Pin	Function
	1	BI_DB +
	2	BI_DB -
	3	BI_DA +
	4	BI_DD +
	5	BI_DD -
	6	BI_DA -
	7	BI_DC +
	8	BI_DC -

Table 6: Pin assignment of a 1000 MBit/s TP interface in MDI-X mode, RJ45 socket

100 Mbit/s F/O connection

In device variants RS20...U, these ports are DSC connectors or ST connectors.
In device variants RS30...U, these ports are SFP slots.
100 MBit/s F/O ports enable the connection of terminal devices or independent network segments in compliance with the IEEE 802.3 100BASE-FX standard.
These ports support:

- Full duplex mode

State on delivery: full duplex FDX

Note: Make sure that the LH ports are only connected with LH ports, SM ports are only connected with SM ports, and MM ports only with MM ports.

1 Gbit/s F/O connection

These ports are SFP slots.
1 Gbit/s F/O ports enable the connection of terminal devices or independent network segments according to the IEEE 802.3 1000BASE-SX/1000BASE-LX standard.
These ports support:

- Autonegotiation

Note: Make sure that the LH ports are only connected with LH ports, SX ports are only connected with SX ports, and LX ports only with LX ports.

Note: In device variants RS30-...02OOZZ... and RS32-...02OOZZ... (four uplink ports with SFP slot) Gigabit-ETHERNET-SFP transceivers or Fast-ETHERNET-SFP transceivers can be mounted at the two top ports, and Fast-ETHERNET-SFP transceivers can be mounted at the two bottom ports (see page 34 “Accessories“).

2.2 Display elements

After the operating voltage is switched on, the device performs a self-test.

Device state

These LEDs provide information about conditions which affect the operation of the whole device.

Figure 15: Device status LEDs

P - Power (green/yellow LED)	
Glowing green	Both supply voltages are on
Glowing yellow	There is only one supply voltage (P1 or P2) on
Not glowing	Supply voltages P1 and P2 are too low
FAULT - error, signal contact (red LED) [a]	
Glowing red	The signal contact is open, i.e. it is reporting an error.
Not glowing	The signal contact is closed, i.e. it is not reporting an error.

a. If the manual adjustment is active on the “FAULT” signal contact, then the detected error display is independent of the setting of the signal contact.

Port state

The green and yellow LEDs at the individual port display port-related information.

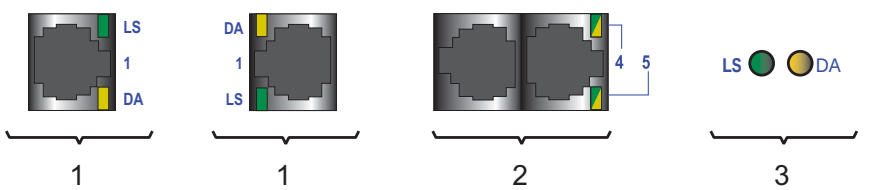


Figure 16: Port status LEDs

1 – Port status LEDs for isolated or single-row RJ45 sockets: one green and one yellow LED per port.
2 – Port status LEDs for double-row RJ45 sockets: one LED per port, glowing/flashing either green or yellow.
3 – Port status LEDs for DSC, ST, SFP

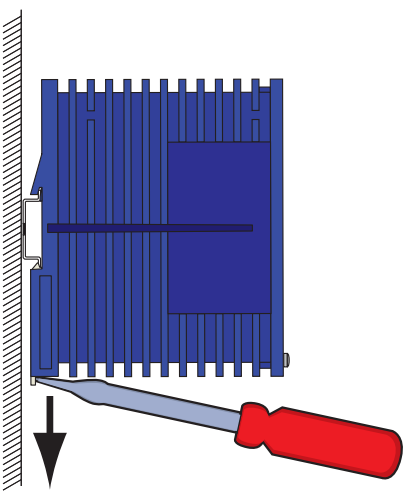
LS - link status (green LED)	
Not glowing	No valid connection.
Glowing green	Valid connection.
Not glowing, and flashes approx. every 5 seconds	Link monitoring is enabled for the port - no valid connection
Glowing green, and goes out briefly approx. every 5 seconds	Link monitoring is enabled for the port - valid connection

DA - data (yellow LED)	
Not glowing	No data reception at corresponding port
Flashing yellow	Data reception at corresponding port

2.3 Disassembly

Removing the device from the DIN rail

☐ To take the device off the DIN rail, insert a screwdriver horizontally under the housing into the locking slide, pull it (without tipping the screwdriver) downwards and lift the device upwards.



Disassembling the SFP modules

☐ Pull the module out of the socket by means of the opened lock.

☐ Close the module with the protective cap.

3 Technical data

General technical data

Dimensions W x D x H	RS20-08..., RS20-09..., RS30-0802 RS20-16..., RS20-17..., RS30-1602 RS20-24..., RS20-25..., RS30-2402	74 mm x 131 mm x 111 mm 110 mm x 131 mm x 111 mm 110 mm x 131 mm x 111 mm
Weight	RS20-08..., RS20-09..., RS30-0802 RS20-16..., RS20-17..., RS30-1602 RS20-24..., RS20-25..., RS30-2402	410 g 600 g 650 g
Power supply	Operating voltage	9.6 to 60 V DC or 18 to 30 V AC Safety extra-low voltage (SELV), redundant inputs disconnected. Relevant for North America: NEC Class 2 power source max. 5A.
Overload current protection at input		Non-replaceable fuse
Insulation voltage between operating voltage connections and housing		800 V DC Protective elements limit the insulation voltage to 90 V DC (1mA)
"FAULT" signal contact	Switching current	max. 1 A, SELV
	Switching voltage	max. 60 V DC or max. 30 V AC, SELV
Environment	Storage temperature (ambient air)	Standard: -40 °C to +70 °C Extended: -40 °C to +85 °C
	Humidity	10% to 95% (non-condensing)
	Air pressure	Up to 2000 m (795 hPa), higher altitudes on request
Operating temperature	Standard	0 °C to +60 °C
	Extended	-40 °C to +70 °C
Pollution degree		2
Protection classes	Laser protection	Class 1 according to EN 60825-1 (2001)
	Protection class	IP 20

EMC and immunity

EMC interference immunity		**A** [a)]	**B** [a)]	**H** [a)]
IEC/EN 61000-4-2	Electrostatic discharge			
	Contact discharge Air discharge	4 kV 8 kV	8 kV 15 kV	8 kV 15 kV
IEC/EN 61000-4-3	Electromagnetic field			
	80 - 3,000 MHz	10 V/m	20 V/m	20 V/m
IEC/EN 61000-4-4	Fast transients (burst)			
	Power line Data line	2 kV 1 kV	4 kV 4 kV	4 kV 4 kV

EMC interference immunity		A [a)]	B [a)]	H [a)]
IEC/EN 61000-4-5	Voltage surges			
	Power line, line / line	0.5 kV	1 kV	1 kV
	Power line, line / earth	1 kV	2 kV	2 kV
	Data line	1 kV	4 kV	4 kV
IEC/EN 61000-4-6	Line-conducted interference voltages			
	10 kHz - 150 kHz	3 V	3 V	3 V
	150 kHz - 80 MHz	10 V	10 V	10 V
EN 61000-4-9	Impulse-shaped magnetic fields	—	300 A/m	300 A/m
EMC emitted interference		**A [a)]**	**B [a)]**	**H [a)]**
EN 55022	Class A	Yes	Yes	Yes
FCC 47 CFR Part 15	Class A	Yes	Yes	Yes
German Lloyd	Classification + Construction Guidelines VI-7-3 Part 1 Ed.2001	—	Yes	Yes
Stability		**A[a]**	**B [a)]**	**H [a)]**
Vibration	IEC 60068-2-6 Test FC test level according to IEC 61131-2	Yes	Yes	Yes
	Germanischer Lloyd Guidelines for the Performance of Type Tests Part 1	—	Yes	Yes
	IEC 870-2-2 table 3 normal installation according to EN 61850-3	—	Yes	Yes
Shock	IEC 60068-2-27 Test Ea test level according to IEC 61131-2	Yes	Yes	Yes
	IEC 870-2-2 table 3 normal installation according to EN 61850-3	—	Yes	Yes

a. Product code A: Certification = CE, UL
Product code B: Certification = CE, UL, GL, railway (along track), sub station, ATEX
Product code H: Certification = CE, UL, GL, railway (along track), sub station
(s. page 12 “Combination options for RS20/30-...U“)

Network range

TP port	
Length of a twisted pair segment	max. 100 m / 328 ft (cat5e cable with 1000BASE-T)

Table 7: TP port 10BASE-T / 100BASE-TX / 1000BASE-T

Product code		Wave length	Fiber	System attenuation	Expansion	Fiber data
-M2, -MM	MM	1300 nm	50/125 µm	0-8 dB	0-5 km	1.0 dB/km, 800 MHz*km
-M2, -MM	MM	1300 nm	62.5/125 µm	0-11 dB	0-4 km	1.0 dB/km, 500 MHz*km
-S2, -VV	SM	1300 nm	9/125 µm	0-16 dB	0-30 km	0.4 dB/km; 3.5 ps/(nm*km)
-L2, -LL	LH	1550 nm	9/125 µm	7-29 dB	24-86 km	0.3 dB/km; 19 ps/(nm*km)

Table 8: F/O port 100BASE-FX

Product code M-FAST SFP-...		Wave length	Fiber	System attenuation	Expansion	Fiber data
-MM/LC...	MM	1310 nm	50/125 µm	0-8 dB	0-5 km	1.0 dB/km, 800 MHz*km
-MM/LC...	MM	1310 nm	62.5/125 µm	0-11 dB	0-4 km	1.0 dB/km, 500 MHz*km
-SM/LC...	SM	1310 nm	9/125 µm	0-13 dB	0-25 km	0.4 dB/km; 3.5 ps/(nm*km)
-SM+/ LC...	SM	1310 nm	9/125 µm	10-29 dB	25-65 km	0.4 dB/km; 3.5 ps/(nm*km)
-LH/LC	SM	1550 nm	9/125 µm	10-29 dB	40-104 km	0.25 dB/km; 19 ps/(nm*km)

Table 9: Fiber port 100BASE-FX (SFP fiber optic Fast ETHERNET Transceiver)

Product code M-SFP-...		Wave length	Fiber	System attenuation	Expansion	Fiber data
-SX/LC...	MM	850 nm	50/125 µm	0-7.5 dB	0-550 m	3.0 dB/km, 400 MHz*km
-SX/LC...	MM	850 nm	62.5/125 µm	0-7.5 dB	0-275 m	3.2 dB/km, 200 MHz*km
-MX/LC...	MM	1310 nm	50/125 µm	0-8 dB	2 km [a]	1.0 dB/km, 500 MHz*km
-MX/LC	MM	1310 nm	62.5/125 µm	0-8 dB	1 km	1.0 dB/km, 500 MHz*km
-LX/LC...	MM	1310 nm[b]	50/125 µm	0-11 dB	0-550 m	1.0 dB/km, 800 MHz*km
-LX/LC...	MM	1310 nm [b]	62.5/125 µm	0-11 dB	0-550 m	1.0 dB/km, 500 MHz*km
-LX/LC...	SM	1310 nm	9/125 µm	0-11 dB	0-20 km	0.4 dB/km; 3.5 ps/(nm*km)
-LX+/LC	SM	1310 nm	9/125 µm	5-20 dB	14-42 km	0.4 dB/km; 3.5 ps/(nm*km)
-LH/LC...	LH	1550 nm	9/125 µm	6-22 dB	24-72 km	0.25 dB/km; 19 ps/(nm*km)
-LH+/LC	LH	1550 nm	9/125 µm	15-32 dB	60-120 km	0.25 dB/km; 19 ps/(nm*km)

Table 10: Fiber port 1000BASE-FX (SFP fiber optic Gigabit ETHERNET Transceiver)

a. Distances up to 3 km reachable, 1000 MHz*km (1300 nm)
b. With F/O adapter compliant with IEEE 802.3-2002 clause 38 (single-mode fiber offset-launch mode conditioning patch cord)

MM = Multimode, SM = Singlemode, LH = Singlemode Longhaul

Power consumption/power output

Device name	Device model	Maximum power consumption	Power output
2 uplink ports:			
RS20-0800...	2xTX port	5.3 W	18.1 Btu (IT)/h
RS20-0800...	1xFX port, 1xTX port	6.5 W	22.2 Btu (IT)/h
RS20-0800...	2xFX port	7.3 W	26.3 Btu (IT)/h
RS20-1600...	2xTX port	9.4 W	32.1 Btu (IT)/h
RS20-1600...	1xFX port, 1xTX port	10.6 W	36.2 Btu (IT)/h
RS20-1600...	2xFX port	11.8 W	40.3 Btu (IT)/h
RS20-2400-...	2xTX port	12.1 W	41.3 Btu (IT)/h
RS20-2400-...	1xFX port, 1xTX port	13.3 W	45.4 Btu (IT)/h
RS20-2400-...	2xFX port	15.5 W	52.9 Btu (IT)/h
RS30-0802-...	2xTX port	8.9 W	30.4 Btu (IT)/h
RS30-0802-...	1xFX port, 1xTX port	8.6 W	29.4 Btu (IT)/h
RS30-0802-...	2xFX port	8.3 W	28.4 Btu (IT)/h
RS30-1602-...	2xTX port	13.0 W	44.4 Btu (IT)/h
RS30-1602-...	1xFX port, 1xTX port	12.7 W	43.4 Btu (IT)/h
RS30-1602-...	2xFX port	12.4 W	42.4 Btu (IT)/h
RS30-2402-...	2xTX port	15.7 W	53.6 Btu (IT)/h
RS30-2402-...	1xFX port, 1xTX port	15.4 W	52.6 Btu (IT)/h
RS30-2402-...	2xFX port	15.1 W	51.6 Btu (IT)/h
3 uplink ports:			
RS20-0900-...	3xFX port	9.6 W	32.8 Btu (IT)/h
RS20-1700-...	3xFX port	13.7 W	46.7 Btu (IT)/h
RS20-2500-...	3xFX port	16.4 W	56.0 Btu (IT)/h
4 uplink ports:			
RS30-0802-...	4xFX port	12.7 W	43.3 Btu (IT)/h
RS30-1602-...	4xFX port	16.8 W	57.3 Btu (IT)/h
RS30-2402-...	4xFX port	19.5 W	66.5 Btu (IT)/h

Table 11: Power consumption/power output RS20-...U/RS30-...U

Scope of delivery

Device	Scope of delivery
RS20-...U, RS30-...U	Device
	Terminal block for supply voltage and signal contact
	Installation user manual and CD-ROM

Order numbers/product description

See table on page 12 “Combination options for RS20/30-...U“.

Accessories

Name	Operating temperature (chassis)	Order number
6-pin terminal block (50 pcs.)		943 845-006
Pocket Guide		280 710-851
Rail Power Supply RPS 30		943 662-003
Rail Power Supply RPS 80 EEC		943 662-080
Rail Power Supply RPS 120 EEC		943 662-120
Gigabit ETHERNET SFP Transceiver		
M-SFP-SX/LC	0 °C to +60 °C	943 014-001
M-SFP-LX/LC	0 °C to +60 °C	943 015-001
M-SFP-LH/LC	0 °C to +60 °C	943 042-001
M-SFP-LH+/LC	0 °C to +60 °C	943 049-001
Fast ETHERNET SFP Transceiver		
M-FAST SFP-MM/LC	0 °C to +60 °C	943 865-001
M-FAST SFP-SM/LC	0 °C to +60 °C	943 866-001
M-FAST SFP-SM+/LC	0 °C to +60 °C	943 867-001
M-FAST SFP-LH/LC	0 °C to +60 °C	943 868-001

Underlying norms and standards

Name	
cUL 508:1998	Safety for Industrial Control Equipment
EN 50121-4:2006	Railway applications - EMC - emitted interference and interference immunity for signal and telecommunication systems
EN 55022:2006 + A1:2007	IT equipment – radio interference characteristics
EN 60079-15	Electrical equipment for explosive gas atmospheres – part 15: Construction, testing and marking of protection type "n" electrical apparatus.
EN 61000-6-2:2005	Generic norm – immunity in industrial environments
EN 61131-2:2007	Programmable logic controllers
FCC 47 CFR Part 15:2009	Code of Federal Regulations
Germanischer Lloyd	Ship Applications - Classification and Construction Guidelines VI-7-3 Part 1 Ed.2003
IEC/EN 60950-1:2006	Safety for the installation of IT equipment
IEC/EN 61850-3	Communications networks and systems in stations
IEEE 1613	Standard Environment and Testing Requirements for Communication Networking Devices in Electric Power Substations
ISA 12.12.01 (cUL 1604), CSA C22.2 No. 213	Electrical Equipment for Use in Class I and Class II, Div.2 and Class III Hazardous (Classified) Locations
KR	Korean Register of Shipping

Table 12: List of norms and standards

The device has a certification based on a specific standard only if the certification indicator appears on the housing.

However, with the exception of Germanischer Lloyd, ship certifications as well as RINA certifications are only included in the product information under www.beldensolutions.com.

A Further Support

Technical Questions and Training Courses

In the event of technical queries, please contact your local Hirschmann distributor or Hirschmann office.
You can find the addresses of our distributors on the Internet: www.beldensolutions.com.

Our support line is also at your disposal:

- Tel. +49 1805 14-1538
- Fax +49 7127 14-1551

Answers to Frequently Asked Questions can be found on the Hirschmann internet site (www.beldensolutions.com) at the end of the product sites in the FAQ category.
The current training courses to technology and products can be found under http://www.hicomcenter.com.

Hirschmann Competence Center

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- Training offers you an introduction to the basics, product briefing and user training with certification.
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